

# Kansas State University

## Trotter Hall

Veterinary Anatomy Labs Renovation Trotter Hall 3<sup>rd</sup> Floor

## PROGRAM

March 2016

Prepared by BN Architects  
and  
Facilities Campus Planning and Project Management  
and  
College of Veterinary Medicine



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## Introduction

The primary purpose of this renovation will be to not only update the current facilities but enhance the educational culture with new gross anatomy labs, microanatomy lab and student lounge. It will also provide some much needed service spaces for the gross anatomy lab and update the ventilation systems in the labs.

### Educational Goal

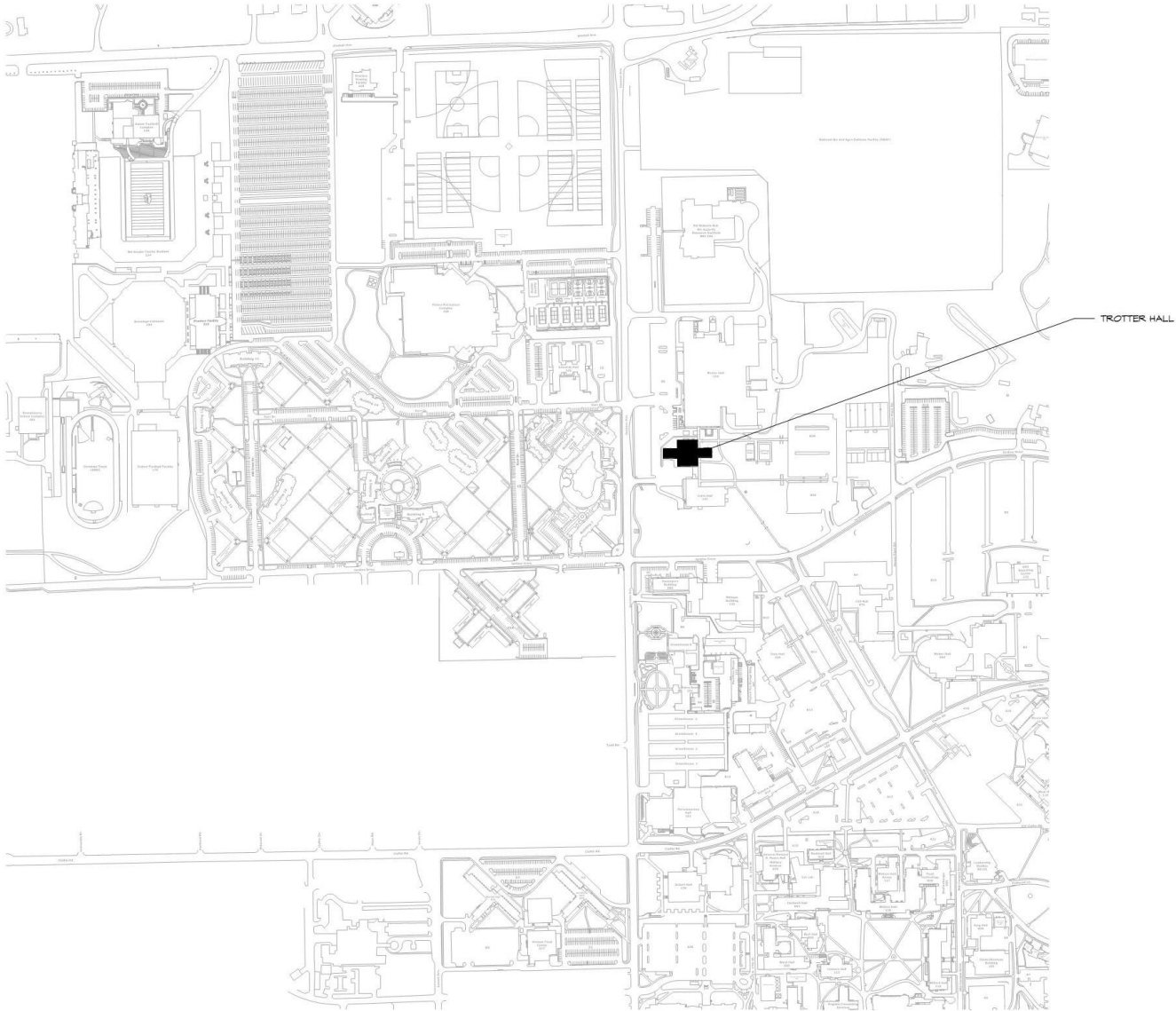
The educational goal of this renovation will be to provide the students higher quality space with embedded tools that they need to support a healthy productive learning environment. The current 3rd floor space is a large lab which supports large animal anatomy, microanatomy and student study space. Whereas up to now all of these functions were performed in a single space, these changes will segregate lab, lecture, and lounge spaces. This will mean more efficient spaces for teaching and safer, more inviting spaces for students to study and socialize.

### Functional Goals

This renovation will also consider current functional requirements. The student shower room/restrooms will be reconfigured to optimize space and provide ADA compliance. The Student Lounge will be flexible and will integrate technology to accommodate the students and aid them in productive study time. Much needed prep space and coolers will be added for the gross anatomy lab. A new museum space will store and display the abundance of anatomical models, teaching specimens and other curated items. Careful consideration should be given to ease of cleanability of each space.



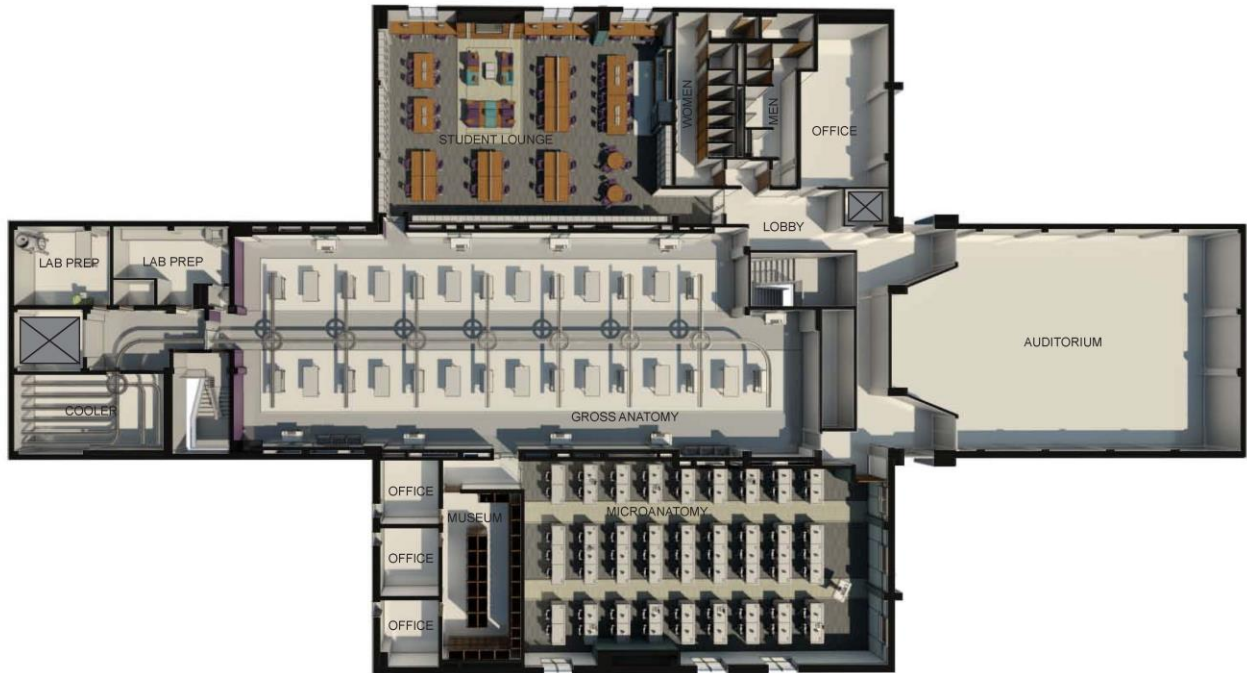
Site Map



 CAMPUS MAP  
1" = 400'

# Project Description

## Concept Plan



## Gross Anatomy Lab

This large, centrally located space will primarily support the dissection of various species, including dogs and small horses. Primary adjacencies are the specimen cooler, prep space, freight elevator and shower rooms/ restrooms. Secondary adjacencies are student lounge, microanatomy lab, museum and faculty office space.

This space should be a large open space with an overhead track centrally located for the large animal species to be moved into the space. The conveyance track should be configured as a central spine with "spurs" allowing specimens to be located and relocated among each of 15 student group workstations. The track system shall be designed to carry up to 15 specimens each weighing up to 1200 lbs. Flexible tables and technology will be critical for the function of this space as it will be reconfigured many times a semester to facilitate small horse dissection, dog dissection, assessment and testing, etc. The Gross Anatomy lab should also be equipped with several computer/monitor stations for use by students to access digital and online teaching resources.

The space should have easily cleanable surfaces with floor drains placed down the center of the room. Because the species being dissected are preserved with formaldehyde, a well-designed ventilation system will be needed.



## Microanatomy Lab

This space will combine lecture style teaching environment with hands-on study of microscopic anatomical structures.

The space should be well lit but controllable for the various light levels that will be needed in this space. Acoustics will also be important, carpet and acoustic ceiling are recommended. Additional acoustic control may be necessary.

The desire is to have work tables that work well for individual study or can be gathered around for small groups. Each table should have a lockable cabinet for microscope, power for microscopes and a drawer for keeping slides. The teaching area will need equipment for simultaneous projection over many monitors throughout the space.

The microanatomy lab will provide individual seating for approx. 60 students, plus a faculty lecturer.



## Student Lounge

The students need a space where they can retreat to between classes. Ideally, this space will be located close to the restrooms and gross anatomy lab.

This lounge should have areas for individual study, group study and comfortable lounging. Each student will have their own locker for books and personal belongings. Ample power and data connections with a few areas for embedded technology for small group use shall be provided throughout. Carpet and acoustic ceiling will help with noise control and add to the comfortable feel. Large windows will be added along the North wall to allow more natural daylight into the space. The space should seat up to 50 students at any given time. A sink, microwave and refrigerator will be provided in a small kitchenette for student use.

Consider pink noise system in this space because there could be a lot of students at one time.



## Museum and Office Suite

A museum and office suite will be added adjacent to the gross anatomy lab. Within this suite, 3 faculty offices will open to a shared "museum", which will hold a portion of the Vet Med collection of anatomical models and teaching specimens. Each office will be for 1 professor and should include desk, file storage, and some guest seating. The museum should have glass door storage cabinets and specimen drawers of various sizes.



## Restroom/Shower Rooms

The restrooms/shower rooms will need to be reconfigured to remove lockers and make the space fully ADA compliant. Men's and Women's restrooms will each have one shower room.

## Prep and Storage Spaces

A new cooler space will be added for animal storage. The overhead track needs to transition into the cooler for storage. The square footage of the cooler to be approximately 400sf.

The new prep spaces are needed for preparing the animals for dissection. These spaces will need to be properly ventilated because there is likely to be high exposure to formaldehyde. Specific requirements for prep area will include: a chemical fume hood for specific specimen preparation, a ventilated necropsy table, a large steam kettle with a type II exhaust hood and a band saw with exhaust hood.

## Office Spaces

Renovation of existing office space North of the lobby will be included in this project. Finishes will include acoustic ceiling tile, carpet tile and painting.

## Mechanical Systems

The proposed renovation area is served by a constant air volume (CAV), dual duct air handling unit (AHU) located in the basement mechanical room. The AHU also supplies air to a small portion of the basement, the first floor lab space, and the second floor lab space. There are approximately sixty-six dual duct terminal boxes connected to this system. Air is returned to the AHU through the ceiling plenum at each floor to a common vertical shaft open to the basement.

General exhaust of the first, second, and third floor lab spaces is provided by four roof mounted fans. The labs are connected by two common, vertical shafts to the exhaust fans above. Most of the original fume hoods in these labs and their associated remote exhaust fans have been removed.

During this study field testing of the existing AHU, dual duct boxes, and exhaust fans associated with the spaces served was performed by Doyle Field Services. In short, the equipment has aged past its expected life and is no longer performing as originally scheduled. Additionally, the temperature controls associated with the AHU and lab spaces have been compromised. Occupants are no longer able to increase the ventilation rate in the lab spaces through the existing manual control switches. Based on the original scheduled exhaust volumes the designed air change rate for the Gross Anatomy Lab was 16 air changes per hour. The current air change rate for the Gross Anatomy Lab is 9 air changes per hour. The existing equipment is not adequate to serve the proposed renovation.

Our recommendation is to replace the existing AHU, third floor dual duct boxes, and general lab exhaust fans. Because the third floor dual duct boxes account for only one-third of the terminal units connected to the AHU, we propose installing equipment that can operate as a constant air volume system and then be modified through control programming to a variable air volume (VAV) system. This change would occur in the future when the balance of existing dual duct boxes on the basement, first, and second floors are replaced.

We solicited the help of a local manufacturer's representative and mechanical contractor to develop a plan for the significant task of replacing the physically large AHU located in the Trotter basement. This plan calls for the removal and replacement of the AHU by way of the existing outside air intake areaway to grade. It has been verified through multiple visits to the site that the work can be accomplished per this plan.

Replacement of the existing AHU and general lab exhaust fans provides the opportunity to introduce heat recovery coils as an energy conservation measure. A heat reclaim system consisting of run around coils and a pump would be provided to recover energy from the exhaust air stream and transfer that energy to the new AHU.

Our proposed Gross Anatomy Lab design calls for a minimum, unoccupied ventilation rate of 10 air changes per hour. During occupied periods the ventilation rate would increase to 20 air changes per hour. Formaldehyde sensors in the Lab would provide a demand based increase in the ventilation rate during the unoccupied portion of the time schedule. Once formaldehyde levels rise past a designated threshold the Lab ventilation rate would increase from 10 to 20 air

changes per hour. At all times the Gross Anatomy Lab would be maintained under negative pressure relative to the surrounding spaces. None of the Gross Anatomy Lab air would be recirculated.

New dual duct boxes would supply air to the proposed renovation space. In the Gross Anatomy Lab the air would be supplied from the ceiling at a low velocity through laminar flow diffusers. Sidewall exhaust air grilles would be located near the floor. This arrangement would minimize evaporated embalming solution in the occupant breathing zone.

The existing Honeywell Direct Digital Control (DDC) system in the Vet Med complex would be expanded to serve the new HVAC equipment in the renovated area.

## Electrical Systems

The existing, original General Electric branch panelboards in the third floor lab would be replaced by new panels with an increased circuit count.

General lighting throughout the renovated area would be provided by the LED lay-in troffer that Vet Med has standardized on. Lighting would be controlled by low voltage switches compatible with the factory mounted controller provided in the LED troffers. This would allow for multiple lighting scenes in the Gross Anatomy Lab, Micro Anatomy Classroom, and Student Lounge. Controllers would be networked together to provide the ability to run time schedules.

Fire alarm in the renovation area would be provided from an existing Honeywell addressable fire alarm control panel located in the basement mechanical room. New fire alarm notification compliant with current code requirements would be a significant improvement to the existing installation.

Boxes and conduit, with pathways back to the existing third floor telecommunications closet, for telephone and data outlets in the renovation area would be provided for installation of conductors and telecommunications equipment by KSU Telecom.

## Plumbing Systems

The existing plumbing supply, waste and vent systems would be modified to serve new plumbing fixtures in the renovation area. Existing systems that would be affected include: cold water, hot water and hot water recirculation, compressed air, natural gas, nitrogen, carbon dioxide, normal waste and vent, and acid waste and vent.

The existing Gross Anatomy Lab floor drains which reportedly are frequently clogged would be replaced by floor sinks with an integral sediment bucket. This replacement would require working above the lay-in ceiling of the second floor lab below.

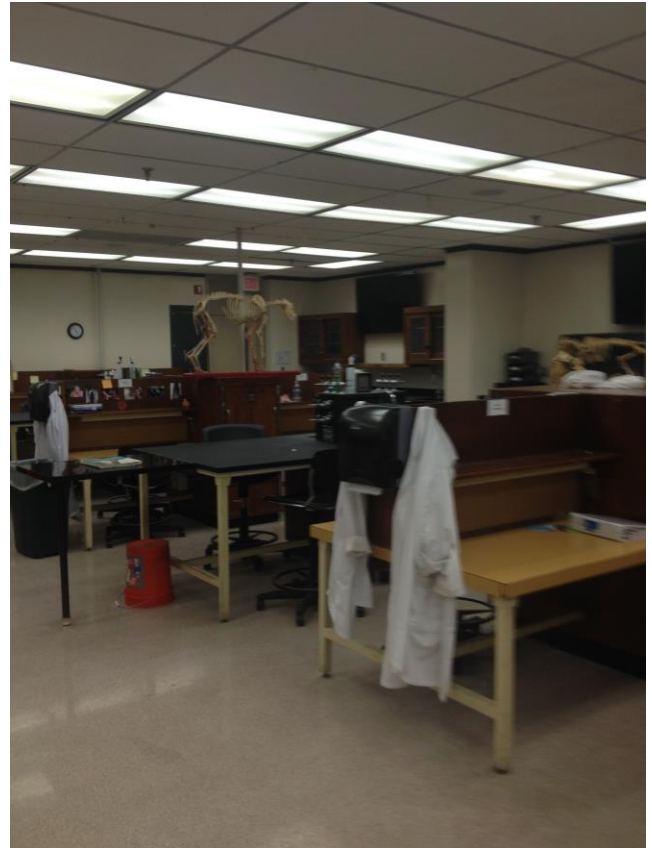
## Fire Protection System

The existing wet fire sprinkler system would be modified to provide a fully sprinkled renovation area per the requirements of NFPA 13.

## Current Conditions & Space Summaries

The existing 3<sup>rd</sup> floor is one large space to serve various functions of the curriculum, student study space, gross anatomy lab and microanatomy lab. The combination of these 3 functions complicates teaching and studying and is not ideal for current curriculum needs. The renovation will allow for separate functional spaces that will enhance the student learning experience and provide current equipment and facilities for the modern veterinary medicine classroom.

Existing images:





## Space Projection / Summaries

Floor Level		
Name of Space	Size of Space	
Gross Anatomy	5040	SF
Micro Anatomy	2820	SF
Student Lounge	2350	SF
Museum	500	SF
Office	150	SF
Office	150	SF
Office	150	SF
Lab Prep	225	SF
Custodial	40	SF
Storage	330	SF
Cooler	430	SF
Women	400	SF
Men	320	SF
<b>Total</b>	<b>12905</b>	<b>SF</b>

## Budget

Estimate of Project Costs	
<b>Construction</b> (Construction Cost, includes asbestos abatement, etc.)	\$3,342,000
<b>Design Fees</b> (Architect, Engineer, other Consultants)	\$340,000
<b>FF&amp;E</b> (Furniture, A/V, equipment, etc.)	\$635,000
<b>Contingency</b> (%)	\$300,000
<b>Miscellaneous Costs</b> (Administrative fees, internal labor, IT, etc.)	\$83,000
<b>Total</b>	<b>\$4,700,000</b>

## Funding

The project will be funded with private gifts and College of Veterinary Medicine funding resources.

## Maintenance

Because this project only includes renovation of existing spaces and no significant changes in function or equipment, maintenance will continue per the current arrangement.

## Timeline/Schedule

### Design – Selection of AE and start of design - Summer 2016

### Construction Narrative

It is planned that construction will begin at the end of the spring semester in 2017.

The first procedure required will be the abatement of the asbestos in the structure above the third floor ceilings which consists of sprayed on fire protection containing asbestos. It is also expected that all ceiling tile will need to be removed and disposed of appropriately as fire proofing material may have fallen onto the tile from the structure above. The beams will need to be sprayed with non asbestos fire protection after abatement.

Additionally there are area of work that will need to be locally abated at the second floor ceiling to facilitate modifications. Abatement approval protocols will need to happen earlier so that work can begin upon the end of classes.

It is planned that work will progress through the summer and will proceed in a logical and planned sequence so that the gross anatomy lab can be located on the central and north wing of the first floor during the fall semester of classes. This will require logistics planning relative to exiting and the management of ventilation and area environmental separation. (The fall semester is when the cadavers of dogs are dissected and will be much more manageable than the spring semester when small horses are worked with).

The general contractor and his subcontractors will have been under contract in early 2017 in order that they may have purchased equipment and materials in advance of the start of work in May. This will facilitate expediting the installation of mechanical equipment in particular that is time critical for completion of the entire project by December 15, 2017, and in time for the spring semester anatomy classes in the new spaces. All temperature control work and commissioning of the mechanical and lighting control systems must be completed by this date.

**Anticipated Construction Completion December 15, 2017**

**Re-occupancy of space – January 2018**